

What is claimed is:

1. An apparatus for treating vascular aneurysms, comprising:

at least one support member having at least a first surface; and

a reactive material selectively applied to said support member, said reactive material having a non-reacted state and a reacted state, wherein said reacted state is capable of restricting a blood flow to said aneurysm.

2. The apparatus of claim 1 wherein said support member comprises a first surface and an adjacent second surface, and wherein said reactive material is applied to said first surface.

3. The apparatus of claim 2 wherein said reactive material is applied to said first and second surfaces.

4. The apparatus of claim 2 wherein said reactive material is applied to a portion of said first and second surfaces.

5. The apparatus of claim 1 wherein said reactive material is applied to a portion of said first surface.

6. The apparatus of claim 1 wherein said at least one support member further comprises said reactive material.

7. The apparatus of claim 1 wherein said reactive material is integrally formed with said at least one support member.

8. The apparatus of claim 1 wherein said reactive material is interwoven with said at least one support member to provide a woven structure.

9. The apparatus of claim 1 wherein said reactive material has a non-reacted volume of  $V$  and a reacted volume of  $V'$ , wherein  $V'$  is larger than  $V$ .

10. The apparatus of claim 9 wherein said reactive material is capable of obtaining a reacted volume  $V'$  in the presence of a physiological pH of about 7.4.

11. The apparatus of claim 1 wherein said at least one support member comprises a radially and axially flexible body member, said body member having a first radius of curvature  $R$  and a second radius of curvature  $R'$ , wherein  $R'$  is larger than  $R$ .

12. The apparatus of claim 11 wherein said second radius of curvature  $R'$  is substantially equal to a radius of curvature of a receiving blood vessel.

13. The apparatus of claim 11 wherein said at least one support member comprises a vascular patch device having a radially and axially flexible patch body member formed by a plurality of interlocking support members, said patch body member having a plurality of fenestrations formed therein.

14. The apparatus of claim 11 wherein said at least one support member comprises a radially and axially flexible coiled bridge device having a resilient sinusoidal body member, said sinusoidal body member defining a plurality of openings.

15. The apparatus of claim 1 wherein said at least one support member comprises a radially and axially flexible cylindrical body member, said cylindrical body member having a first D and a second D', wherein D' is larger than D.

16. The apparatus of claim 15 wherein said second diameter D' is substantially equal to a diameter of a receiving blood vessel.

17. The apparatus of claim 15 wherein said at least one support member comprises a radially and axially expanding helical stent having a cylindrical body member located between a first end and a second end, said cylindrical body member further defining an internal lumen in communication with said first and second ends.

18. The apparatus of claim 15 wherein said at least one support member comprises a radially and axially reticulated expanding stent having a cylindrical body member located between a first and second end, said cylindrical body member having a plurality of fenestrations formed thereon and further defining an internal lumen in communication with said first and second ends.

19. The apparatus of claim 15 wherein said at least one support member comprises a radially and axially flexible bifurcated support device having a bifurcated body member located between a first end, a second end, and a third end, said bifurcated body member having a plurality of fenestrations formed thereon and further defining an internal lumen in communication with said first, second, and third ends.

20. The apparatus of claim 1 where said at least one support member is capable of being delivered to a situs in vivo and controllably released from a delivery device, said delivery device selected from the group consisting of catheters, micro-catheters, balloon catheters, expandable catheters, guidewires, wires, and elongated bodies.

21. The apparatus of claim 20 where said at least one support member is capable of being delivered to a situs in vivo and controllably released from a delivery device using a controllable release mechanism selected from the group consisting of mechanical, electrolytic, electro-mechanical, thermal, hydraulic, and shape-memory release mechanisms.

22. The apparatus of claim 1 wherein said support member further comprises at least one attachment device.

23. The apparatus of claim 22, wherein said at least one attachment device is selected from the group consisting of barbs, hooks, needles, spurs, and adhesive areas.

24. The apparatus of claim 1 wherein said support member is manufactured from at least one biologically-compatible material selected from the group consisting of platinum, gold, tantalum, titanium, stainless steel, tungsten, Nitinol, shape memory alloys, polyurethane, polytetrafluoroethylene, polyvinyl alcohol, polyester, silicone, or acrylic.

25. The apparatus of claim 1 wherein said support member comprises radio-opaque materials.

26. The apparatus of claim 1 wherein said support member comprises echo-genic materials.

27. The apparatus of claim 1 wherein said at least one support member comprises an intra-aneurysmal neck bridge device having a bridge body member in communication with at least two engagement members, said at least two engagement members cooperatively forming a joint.

28. The apparatus of claim 27 wherein said intra-aneurysmal neck bridge device is capable of being inserted into a vascular aneurysm.

29. The apparatus of claim 27 wherein said intra-aneurysmal neck bridge device is capable of attaching to and controllably detaching from an elongated delivery apparatus selected from the group consisting of a guidewire, a tube, or a wire.

30. An apparatus for treating vascular aneurysms, comprising:

a vascular patch device having a radially and axially flexible patch body member formed by a plurality of interlocking support members, said support members capable of supporting vascular tissue, said support members having at least a first surface;

said patch body member having a plurality of fenestrations formed therein and having a first radius of curvature  $R$  and a second radius of curvature  $R'$ , wherein  $R'$  is larger than  $R$ ; and

a reactive material selectively applied to said support members, said reactive material having a non-reacted state and a reacted state, wherein said reacted state is capable of restricting a blood flow to said aneurysm.

31. An apparatus for treating vascular aneurysms, comprising:

a coiled bridge device having a radially and axially resilient sinusoidal body member formed by at least one support member, said at least one support member capable of supporting vascular tissue, said at least one support member having at least a first surface;

said sinusoidal body member defining a plurality of openings and having a first radius of curvature  $R$  and a second radius of curvature  $R'$ , wherein  $R'$  is larger than  $R$ ; and

a reactive material selectively applied to said at least one support member, said reactive material having a non-reacted state and a reacted state, wherein said reacted state is capable of restricting a blood flow to said aneurysm.

32. An apparatus for treating vascular aneurysms, comprising:

a helical stent having a radially and axially flexible cylindrical body member located between a first end and a second end, said cylindrical body member further defining an internal lumen in communication with said first and second ends;

said cylindrical body member formed by at least one support member, said at least one support member capable of supporting vascular tissue; said at least one support member having at least a first surface;

said cylindrical body member having a first diameter D and a second diameter D', wherein D' is larger than D; and

a reactive material selectively applied to said at least one support member, said reactive material having a non-reacted state and a reacted state, wherein said reacted state is capable of restricting a blood flow to said aneurysm.

33. An apparatus for treating vascular aneurysms, comprising:

a reticulated expanding stent having a radially and axially cylindrical body member located between a first and second end, said cylindrical body member defining an internal lumen in communication with said first and second ends;

said cylindrical body member formed by at least one support member, said at least one support member capable of supporting vascular tissue; said at least one support member having at least a first surface;

said cylindrical body member having a first diameter D and a second diameter D', wherein D' is larger than D; and

a reactive material selectively applied to said at least one support member, said reactive material having a non-reacted state and a reacted state, wherein said reacted state is capable of restricting a blood flow to said aneurysm.

34. An apparatus for treating vascular aneurysms, comprising:

a bifurcated vascular support device having a radially and axially flexible bifurcated body member located between a first end, a second end, and a third end;

said bifurcated body member comprising at least one support member capable of supporting vascular tissue; said at least one support member having at least a first surface;

an internal lumen located within said bifurcated body member and in communication with said first, second, and third ends

said bifurcated body member having a first diameter D and a second diameter D', wherein D' is larger than D; and

a reactive material selectively applied to said at least one support member, said reactive material having a non-reacted state and a reacted state, wherein said reacted state is capable of restricting a blood flow to said aneurysm.

35. An apparatus for treating vascular aneurysms, comprising:

an intra-aneurysmal bridge device capable of being delivered into an aneurysm, said bridge device having a flexible bridge body member;

at least two engagement members in communication with said bridge body member, said at least two engagement members capable of engaging at least one wall of said aneurysm;

a joint cooperatively formed by said at least two engagement members; and



a reactive material selectively applied to said at least two engagement members, said reactive material having a non-reacted state and a reacted state, wherein said reacted state is capable of restricting a blood flow to said aneurysm.

36. The apparatus of claim 35 wherein said intra-aneurysmal neck bridge device is capable of attaching to and controllably detaching from an elongated delivery apparatus selected from the group consisting of a guidewire, a tube, or a wire.

37. A method of treating a vascular aneurysm, comprising:

providing a device having a reactive material selected applied to at least one support member;

delivering the device to a vascular aneurysm from within a blood vessel;

supporting tissue proximate said aneurysm with said device;

permitting blood to flow through said blood vessel;

activating said reactive material disposed on said device to restrict a blood flow to said aneurysm.

38. The method of claim 37 wherein said step of activating said reacting material occurs in the presence of a physiological pH of about 7.4.

39. The method of claim 37 wherein said step of activating said reactive material further comprises the step of volumetrically expanding said reacting material.

40. The method of claim 37 wherein said step of delivering the device further comprises using a catheter to deliver said device to said aneurysm.

41. The method of claim 37 wherein said step of using a catheter to deliver said device to said aneurysm further comprises using a balloon catheter to deliver said device to said aneurysm.

42. The method of claim 37 further comprising inserting said device into said aneurysm.

43. An apparatus for treating vascular aneurysms, comprising:

at least one support member; and

a reactive material strand woven with said at least one support member to provide an interwoven structure, said reacted material strand having a reacted state and a non-reacted state, wherein said reacted state is capable of restricting a blood flow to said aneurysm.